

THE ARO CORPORATION

400 ENTERPRISE STREET, BRYAN, OHIO 43506



TELEPHONE 636-4242

AREA CODE 419

TWX 810-443-2994

January 4, 1967

Mr. T. Nelson, Systems Consultant
Box 1546
Poughkeepsie, New York 12603

Dear Mr. Nelson:

Thank you for requesting information on the Aro Pneumatic Logic Controls system. . . This is a new concept in pressure-state logic for industrial machine control.

Aro Pneumatic Logic Controls are designed to be used as a true building block system to solve logic control problems utilizing air line pressure from 25 to 150 P.S.I. as the power source. A unique circuit board concept is used for convenient inter-function relationship which is equally adaptable to single or multiple applications.

We have enclosed the literature you requested. If you require additional information or have an immediate application, please contact us at once.

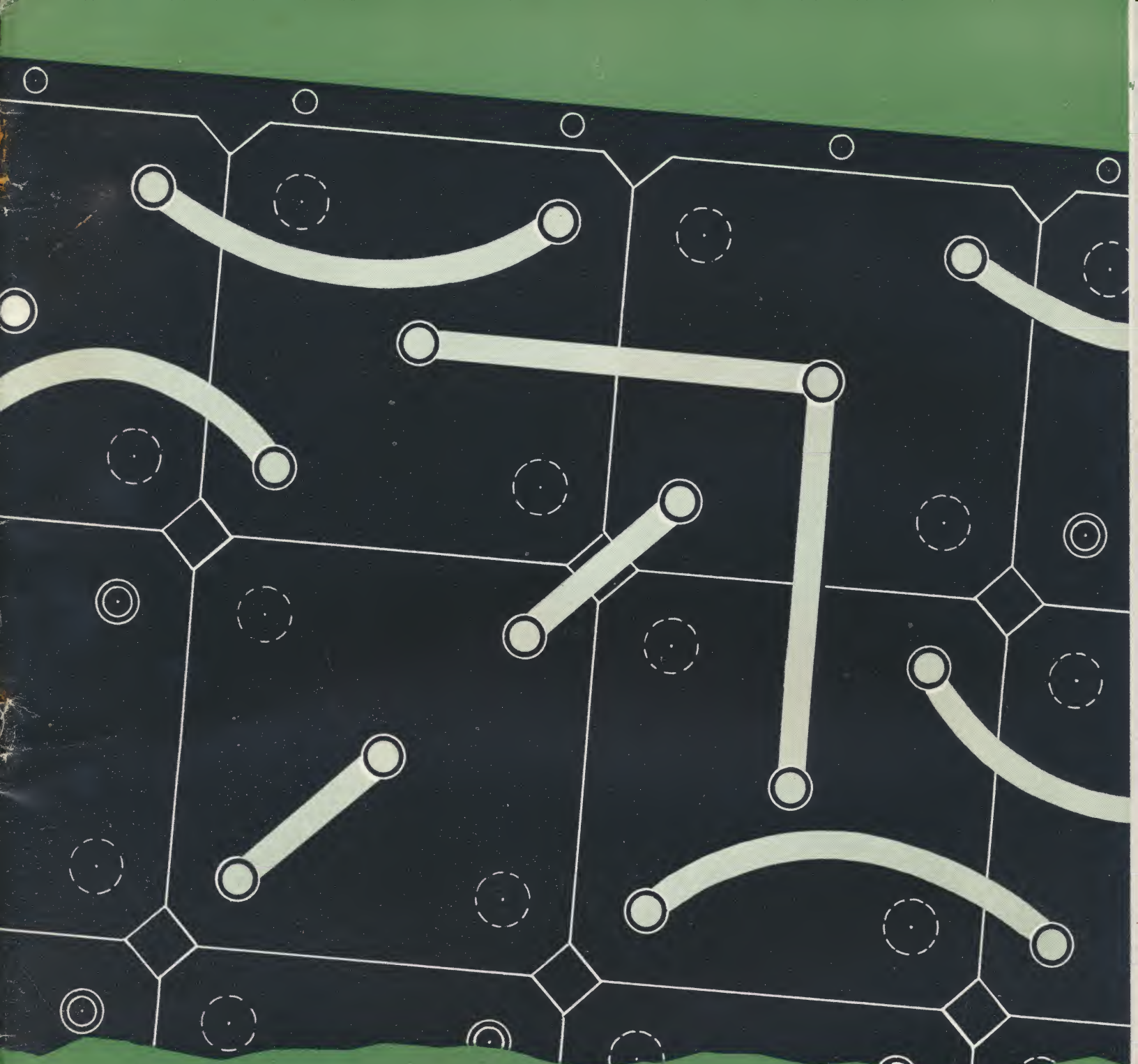
Very truly yours,

THE ARO CORPORATION

R. L. Culbertson
Product Manager
Controls Division

DISTRICT MANAGER:

Mr. Walter Fenn
125 Trumbull Street
Hartford, Connecticut 06103
Phone: (203) 247-8301

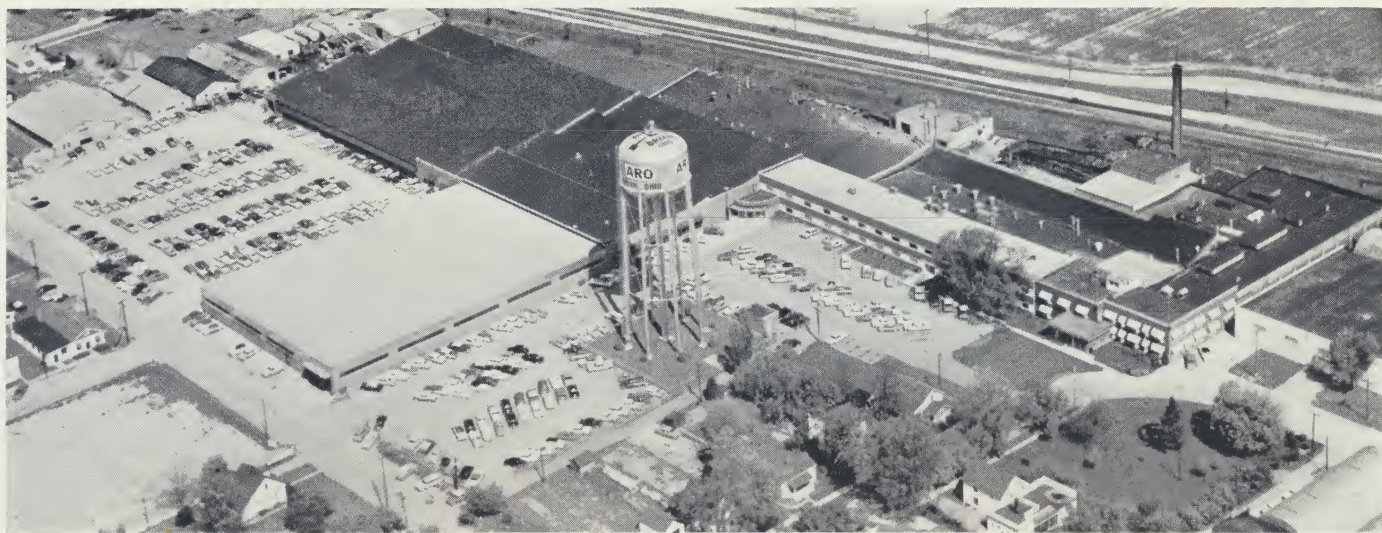


Pneumatic Logic Controls

THE ARO CORPORATION
400 ENTERPRISE STREET, BRYAN, OHIO 43506



CATALOG



This is an aerial view of Aro's main plant and headquarters in Bryan, Ohio. The plant has a manufacturing area in excess of 400,000 square feet and is equipped with modern production and warehousing facilities.

Through research and development, Aro constantly strives to produce better, high-quality products — air-operated products that will help manufacturers improve their production methods and reduce costs.

Aro's most recent development is a radically new control system of pneumatic components known as the Aro Pneumatic Logic Controls. This system is an advanced new concept for overall simplification of pneumatic logic functions.

Aro Pneumatic Logic Controls are especially suited to industrial applications such as automated production, sequencing of operations and control of machines.

This catalog furnishes a complete listing of all Aro Pneumatic Logic Control elements and accessories for the most economical construction of industrial pneumatic control systems. For complete details see the Aro Pneumatic Logic Controls Manual, form 6619-T.

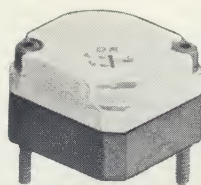
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STANDARD WARRANTY

Following the reasonable assumption that any inherent defect which might prevail in a product will become apparent to the user within three months from the date of purchase, all equipment of our manufacture is warranted against defects in workmanship and materials under normal use and service and we will repair or replace at our factory any equipment or part thereof which shall within 90 days after delivery to the original purchaser indicate upon our examination to have been defective.

Our obligation is contingent upon proper use in accordance with factory recommendations and instructions and shall not apply to equipment which has been subject to misuse, negligence, accident or tampering in a way so as to affect its normal performance.

"OR" LOGIC ELEMENT



MODEL 59010

LOGIC SYMBOL	LOGIC FUNCTION	PORT DESIGNATION
	$a + b = c$ output c (on) with input at a or b	a = input b = input c = output
VALVE SYMBOL	VALVE FUNCTION	PORT DESIGNATION
<p>b - blocked</p>	flow $a \rightarrow c$ only check c to a	a = input b = blocked c = output

For other functions see Technical Manual.

MODEL 59010 "OR" element performs the logic function "OR" with two inputs and one output. (Output is On if one or more Inputs is On . . . Output is Off only if all Inputs are Off.) The element has three bottom ports designated as a, b and c. Each port is marked on the element cover to correspond to base port positions. When attached to the circuit-board, base ports connect circuit passages in the module to complete the required circuitry.

SPECIFICATIONS

1 1/4" square

3/4" height

1 5/8" diagonal measure

1/2" mounting bolt extension

Necessary seals and mounting hardware furnished with element.

OPERATING PRESSURE

50 to 125 P.S.I.G. optimum range

25 to 150 P.S.I.G. maximum range

TEMPERATURE

32° to 160° F. optimum range

-40° to 225° F. maximum range

RESPONSE TIME

"a" on \rightarrow "c" on 6 m.s. (approx.)

"b" on \rightarrow "c" on 6 m.s. (approx.)

FLOW CHARACTERISTICS

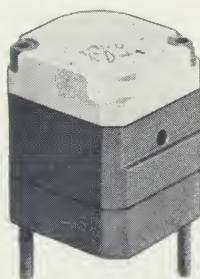
Flow $a \rightarrow c$ at 100 P.S.I.G. = 9.3 C.F.M.

Capacity factor $C_v = 0.14$

Flow $b \rightarrow c$ at 100 P.S.I.G. = 16.2 C.F.M.

Capacity factor $C_v = 0.28$

"AND" LOGIC ELEMENT



MODEL 59011

LOGIC SYMBOL	LOGIC FUNCTION	PORT DESIGNATION
	$a \cdot b = c$ output c (on) with input at a and b	a = input b = input c = output
VALVE SYMBOL	VALVE FUNCTION	PORT DESIGNATION
	3-way nc	a = pilot b = supply c = output

For other functions see Technical Manual.

MODEL 59011 "AND" element performs the logic function "AND" with two inputs and one output. (Output is On only if both Inputs are On. Output is Off if one or more Inputs is Off.) The three bottom ports, designated a, b and c, are correspondingly marked on the element cover. Mounting to the circuit board completes the desired circuitry.

SPECIFICATIONS

1 1/4" square

1 13/32" height

1 5/8" diagonal measure

1/2" mounting bolt extension

Necessary seals and mounting hardware furnished with element.

OPERATING PRESSURE

50 to 125 P.S.I.G. optimum range

25 to 150 P.S.I.G. maximum range

TEMPERATURE

32° to 160° F. optimum range

-40° to 225° F. maximum range

RESPONSE TIME

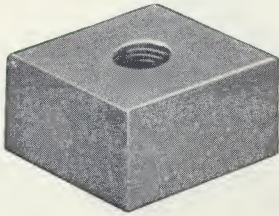
"a" on \rightarrow "c" on 11 m.s. (approx.)

"a" off \rightarrow "c" off 11 m.s. (approx.)

FLOW CHARACTERISTICS

Flow $b \rightarrow c$ at 100 P.S.I.G. = 9.3 C.F.M. free air

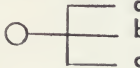
Capacity factor $C_v = 0.14$

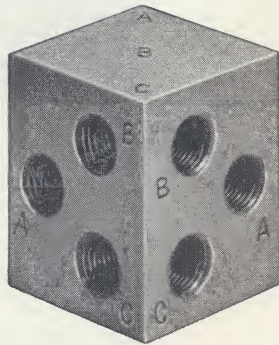
PORTING BLOCKS


MODEL 59018

MODEL 59018 CIRCUIT TOP PORTING BLOCK

The top porting block can be mounted anywhere on the circuit board. It provides one common pipe tap connection to three circuit points. Its main purpose is to avoid excessive pressure drop on distribution of supply to several logic elements. O-rings provide sealing between circuit base plate and bottom ports. Necessary seals and mounting screws furnished with No. 59018 block. Block size 1 1/4" square x 5/8" high.

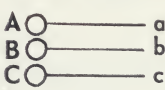
CIRCUIT SYMBOL	CIRCUIT FUNCTION	PORT DESIGNATION
	common supply to three channels	a = connected to supply b = connected to supply c = connected to supply

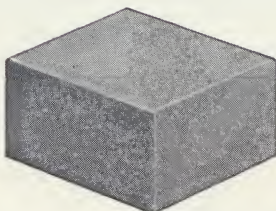


MODEL 59019

MODEL 59019 CIRCUIT SIDE PORTING BLOCK

The side porting block is used for connections around the periphery of the circuit board. It provides three individual pipe tap connections on each of two sides. Pipe ports on the side not in use must be plugged with 1/8" N.P.T. pipe plugs. Each port is marked to correspond to base position. O-rings provide sealing between circuit base plate and bottom ports. Necessary seals and mounting screws furnished with No. 59019 block. Block size 1 1/4" square x 1 1/2" high.

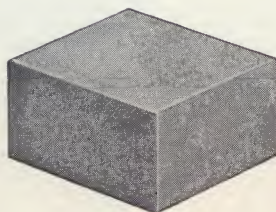
CIRCUIT SYMBOL	CIRCUIT FUNCTION	PORT DESIGNATION
	three separate supplies to circuit board	a = outlet b = outlet c = outlet



MODEL 59020

MODEL 59020 CIRCUIT COVER BLOCK

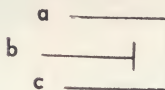
The cover block plugs three connecting holes in the circuit board. The space covered by the block can be used for additional circuit channels in the circuit module. O-rings provide sealing between circuit base plate and bottom face of cover block. Necessary seals and mounting screws furnished with No. 59020 block. Block size 1 1/4" square x 5/8" high.

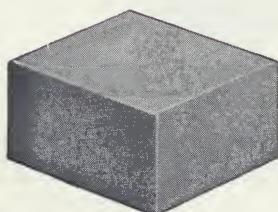


MODEL 59021

MODEL 59021 CIRCUIT-CROSS OVER BLOCK

Crossing of circuit channels cannot always be avoided by arrangement of the elements. Cross-over blocks are used to cross a circuit channel when necessary. O-rings provide sealing between circuit base plate and bottom ports of cross-over block. Necessary seals and mounting screws furnished with No. 59021 block. Block size 1 1/4" square x 5/8" high.


CIRCUIT SYMBOL	CIRCUIT FUNCTION	PORT DESIGNATION
	channel crossing	a = connected to c b = blocked c = connected to a



MODEL 59022

MODEL 59022 CIRCUIT ORIFICE BLOCK

The orifice block provides two fixed orifices connected to a common supply. It is used for bleed functions. For details on "Pneumatic Bleed Function" see Aro technical manual, pages 21-22-23. O-rings provide sealing between circuit base plate and bottom ports of orifice block. Necessary seals and mounting screws furnished with No. 59022 block. Block size 1 1/4" square x 5/8" high.

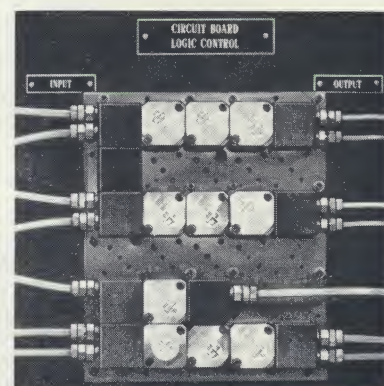
CIRCUIT SYMBOL	CIRCUIT FUNCTION	PORT DESIGNATION
	creates orifice for bleed functions	a = connection to bleeder valve b = supply c = connection to bleeder valve.

PNEUMATIC LOGIC CIRCUIT BOARD

The design features of the Aro Pneumatic Logic Circuit Board System makes possible for the first time the construction of completely interconnected pneumatic logic control circuits and systems. It is truly a building block concept devoid of the tubing and piping maze required for conventional pneumatic controls.

To accomplish this, a circuit module, into which a circuit pattern is cut, provides the necessary flow channels for interconnection of the logic components required by a circuit. The circuit module is then placed between a circuit base plate and a circuit cover plate. The base plate contains ports that match the base porting pattern of the logic elements and accessories.

As the logic components are matched to the circuit base plate, module and cover plate, they are automatically connected to the circuit channels within the module. Mounting hardware and seals furnished with the logic components are then utilized to securely fasten all parts of the system together, effectively sealing all ports. The end result is a completely interconnected pneumatic logic control circuit requiring only input signals and output connections to the units being controlled.



CIRCUIT BOARD COMPONENTS

CIRCUIT BASE PLATE

MODEL 59200 Base Plate is a precision ground and chrome-plated steel plate containing all of the porting necessary to interconnect the logic elements of the logic circuit.

MODEL	DIMENSIONS	ELEMENT COVERAGE
59200-44	1/16" x 5.700 in. sq.	4 x 4
59200-66	1/16" x 9.200 in. sq.	6 x 6
59200-88	1/16" x 10.700 in. sq.	8 x 8

CIRCUIT MODULE

MODEL 59202 Circuit Module is made of a Buna-N coated material specifically processed to provide the required sealing characteristics. A circuit pattern which corresponds to the Aro circuit pattern layout sheet is silk-screened onto the module to facilitate the translation of the circuit pattern to the circuit module.

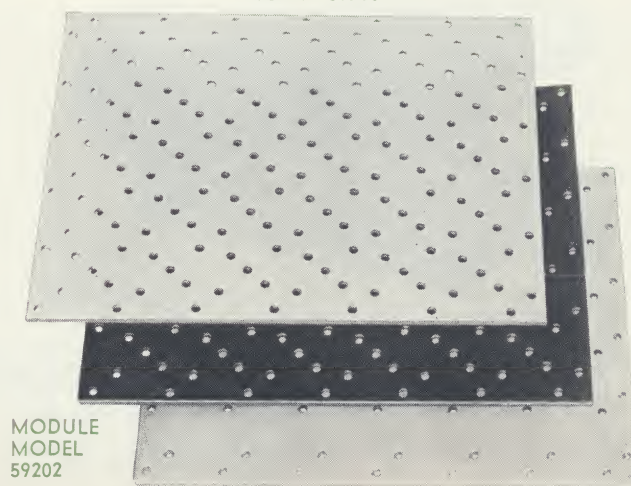
MODEL	DIMENSIONS	ELEMENT COVERAGE
59202-44	1/16" x 5.700 in. sq.	4 x 4
59202-66	1/16" x 9.200 in. sq.	6 x 6
59202-88	1/16" x 10.700 in. sq.	8 x 8

CIRCUIT COVER PLATE

MODEL 59201 Cover Plate is a precision ground, chrome-plated steel plate which retains the Model No. 59202 Circuit Module and contains only the mounting holes required by the logic elements.

MODEL	DIMENSIONS	ELEMENT COVERAGE
59201-44	5/32" x 5.700 in. sq.	4 x 4
59201-66	5/32" x 9.200 in. sq.	6 x 6
59201-88	5/32" x 10.700 in. sq.	8 x 8

BASE PLATE
MODEL 59200



MODULE
MODEL
59202

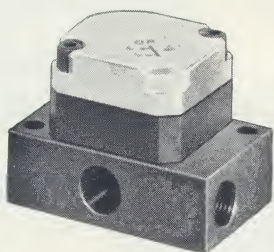
COVER PLATE
MODEL 59201

Perimeter bolts and nuts. Parts No. 59357.
1 package contains 12 pieces.

Logic function assemblies are essentially base-ported valves or manifolded valve groups which perform complete logic functions as tabulated in the following charts.

(For response and flow characteristics refer to pages describing individual logic elements.)

ONE ELEMENT



ONE LOGIC ELEMENT

Port size 1/8" N.P.T.

Temperature 32° to 160° F. optimum range

-40° to 225° F. maximum range

Operating pressure 50 to 125 P.S.I.G. optimum

25 to 150 P.S.I.G. maximum

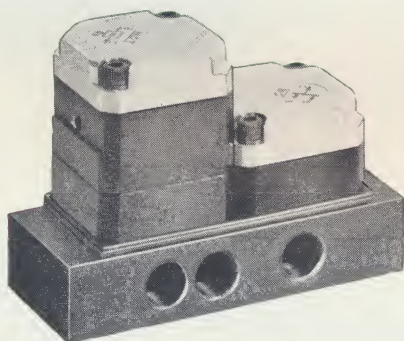
Base size 1 1/4" x 1 7/8" x 5/8"

(2) Mounting holes 3/16" dia. on 7/8" x 1 9/16" centers

If required, consult factory for flow and response time characteristics of function assemblies selected.

SUB-BASE FOR	MODEL NO.	ARO LOGIC ELEMENT TYPE	LOGIC FUNCTION	VALVE FUNCTION
ONE ELEMENT	59023	1 OR	OR-2 Inputs	Single Check
	59024	1 AND	AND-2 Inputs	3-way NC
	59025	1 NOT	NOT	3-way NO
	59026	1 MEM	MEMORY	3-way NC, retained
	59027	1 DIF	DIFFERENTIATOR	Pulse

TWO ELEMENTS



TWO LOGIC ELEMENTS

Port size 1/8" N.P.T.

Temperature 32° to 160° F. optimum range

-40° to 225° F. maximum range

Operating pressure 50 to 125 P.S.I.G. optimum

25 to 150 P.S.I.G. maximum

Base size 1 1/4" x 3 1/8" x 5/8"

(2) Mounting holes 3/16" dia. on 7/8" x 2 13/16" centers

If required, consult factory for flow and response time characteristics of function assemblies selected. *Non-standard but can be assembled from available components.

SUB-BASE FOR	MODEL NO.	ARO LOGIC ELEMENT TYPE	LOGIC FUNCTION	VALVE FUNCTION
TWO ELEMENTS	59028	2 OR	OR-3 Inputs	Standard Range
	59029	2 AND	AND-3 Inputs	
	59030	1 OR, 1 NOT	NOR-2 Inputs	
	59031	1 AND, 1 NOT	NAND-2 Inputs	
	59032	2 DIF	2 DIFFERENTIATOR	
	59041	1 TIM, 1 AND	DELAY, Timing IN	
	59042	1 TIM, 1 NOT	DELAY, Timing IN Inverted	
	59051	1 TIM, 1 AND	DELAY, Timing IN	
	59052	1 TIM, 1 NOT	DELAY, Timing IN Inverted	
	59074	1 DIF, 1 ACCU	DIFFERENTIATOR	
		*2 total of any AND/NOT/MEM	2 total of any 3-way NC/NO/MEM with common supply port	Pulse

NOTE: MODELS 59041 AND 59042 ARE EQUIPPED WITH 59015 TIMER.
MODELS 59051 AND 59052 ARE EQUIPPED WITH 59016 TIMER.

LOGIC FUNCTION ASSEMBLIES



THREE ELEMENTS

THREE LOGIC ELEMENTS

Port size 1/8" N.P.T.

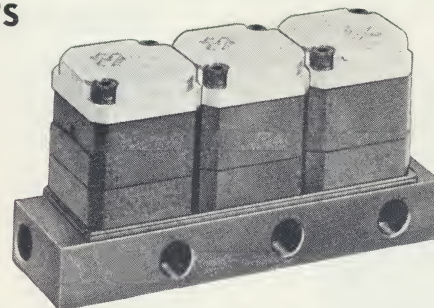
Temperature 32° to 160° F. optimum range
-40° to 225° F. maximum range

Operating pressure 50 to 125 P.S.I.G. optimum
25 to 150 P.S.I.G. maximum

Base size 1 1/4" x 4 3/8" x 5/8"

(2) Mounting holes 3/16" dia. on 7/8" x 4 1/16" centers

If required, consult factory for flow and response time characteristics of function assemblies selected. *Non-standard but can be assembled from available components.



SUB-BASE FOR	MODEL NO.	ARO LOGIC ELEMENT TYPE	LOGIC FUNCTION	VALVE FUNCTION
THREE ELEMENTS	59033	3 OR	OR-4 Inputs	
	59034	3 AND	AND-4 Inputs	
	59035	2 OR, 1 NOT	NOR-3 Inputs	
	59036	2 AND, 1 NOT	NAND-3 Inputs	
	59043	1 TIM, 1 AND, 1 ACU	DELAY, Timing IN	Extended Range
	59044	1 TIM, 1 NOT, 1 ACU	DELAY, Timing IN Inverted	Extended Range
	59045	1 TIM, 2 NOT	DELAY, Timing OUT	Standard Range
	59046	1 TIM, 1 NOT, 1 AND	DELAY, Timing OUT Inverted	Standard Range
	59053	1 TIM, 1 AND, 1 ACU	DELAY, Timing IN	Extended Range
	59054	1 TIM, 1 NOT, 1 ACU	DELAY, Timing IN Inverted	Extended Range
	59055	1 TIM, 2 NOT	DELAY, Timing OUT	Standard Range
	59056	1 TIM, 1 NOT, 1 AND	DELAY, Timing OUT Inverted	Standard Range
		*3 total of any AND/NOT/MEM	3 total of any 3-way NC/NO/MEM with common supply port	

NOTE: MODELS 59043, 59044, 59045 AND 59046 EQUIPPED WITH 59015 TIMER.
MODELS 59053, 59054, 59055 AND 59056 EQUIPPED WITH 59016 TIMER.

FOUR ELEMENTS

FOUR LOGIC ELEMENTS

Port size 1/8" N.P.T.

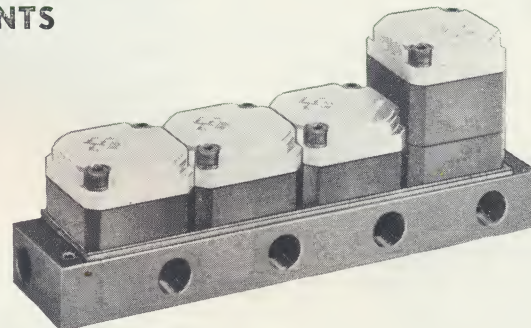
Temperature 32° to 160° F. optimum range
-40° to 225° F. maximum range

Operating pressure 50 to 125 P.S.I.G. optimum
25 to 150 P.S.I.G. maximum

Base size 1 1/4" x 5 1/32" x 5/8"

(2) Mounting holes 3/16" dia. on 7/8" x 5 5/16" centers

If required, consult factory for flow and response time characteristics of function assemblies selected. *Non-standard but can be assembled from available components.

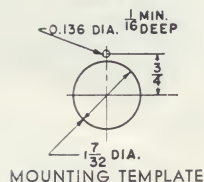
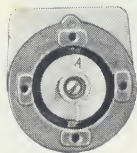
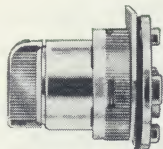


SUB-BASE FOR	MODEL NO.	ARO LOGIC ELEMENT TYPE	LOGIC FUNCTION	VALVE FUNCTION
FOUR ELEMENTS	59037	4 OR	OR-5 Inputs	
	59038	4 AND	AND-5 Inputs	
	59039	3 OR, 1 NOT	NOR-4 Inputs	
	59040	3 AND, 1 NOT	NAND-4 Inputs	
	59047	1 TIM, 2 NOT, 1 ACU	DELAY, Timing OUT	Extended Range
	59048	1 TIM, 1 AND, 1 NOT, 1 ACU	DELAY, Timing OUT Inverted	Extended Range
	59049	2 TIM, 2 NOT	DELAY, Timing IN & OUT	Standard Range
	59050	2 TIM, 1 NOT, 1 AND	DELAY, Timing IN & OUT Inverted	Standard Range
	59057	1 TIM, 2 NOT, 1 ACU	DELAY, Timing OUT	Extended Range
	59058	1 TIM, 1 AND, 1 NOT, 1 ACU	DELAY, Timing OUT Inverted	Extended Range
	59059	2 TIM, 2 NOT	DELAY, Timing IN & OUT	Standard Range
	59060	2 TIM, 1 NOT, 1 AND	DELAY, Timing IN & OUT Inverted	Standard Range
		*4 total of any AND/NOT/MEM	4 total of any 3-way NC/NO/MEM with common supply port	

NOTE: MODELS 59047, 59048, 59049 AND 59050 EQUIPPED WITH 59015 TIMER.
MODELS 59057, 59058, 59059 AND 59060 EQUIPPED WITH 59016 TIMER.

FUNCTION BASE ASSEMBLY	MODEL NO.	PORTING	COMPONENTS	
1 ELEMENT	59243	3 — 1/8" N.P.T.F.	Base Only	*The "B" or element supply port of the intermediate elements is not connected to a 1/8" N.P.T.F. base port. Supply to these elements is furnished by a circuit channel in the function assembly module.
2 ELEMENTS	59061	6 — 1/8" N.P.T.F.	Base, Cover Plate, Module	
3 ELEMENTS	59062	*10 — 1/8" N.P.T.F.	Pipe Plugs, Nuts and Washers	
4 ELEMENTS	59063	*12 — 1/8" N.P.T.F.		

SELECTOR SWITCH OPERATORS



MODEL 59066 Operators are used in conjunction with No.'s 59064 and 59065 Basic Valve Kits to make up pneumatic selector switch type controls. All operators can be panel mounted, simplifying the construction of pneumatic control stations and panels. Each operator will operate one or two control valves. Panel thickness 1/16" min., 1/4" max.

SELECTOR SWITCH OPERATORS

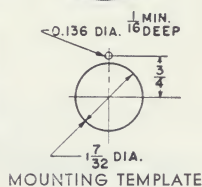
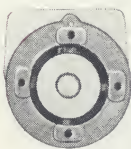
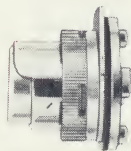
CAM	DESCRIPTION	FEATURES	MODEL NO.	KEY WITHDRAWAL ARRANGEMENT			
A	2-POSITION MAINTAINED	STANDARD KNOB	59066-10	DASH NO.	LEFT	RIGHT	
		GLOVED HAND KNOB	59066-11				
		COIN OPERATED	59066-12	1	YES	NO	
		KEY OPERATED	59066-13*	2	NO	YES	
	2-POSITION SPRING RETURN FROM LEFT TO CENTER	STANDARD KNOB	59066-14	3	YES	YES	
		KEY OPERATED	59066-15				
B	3-POSITION MAINTAINED	STANDARD KNOB	59066-16	DASH NO.	LEFT	CENTER	RIGHT
		GLOVED HAND KNOB	59066-17				
		COIN OPERATED	59066-18	4	YES	NO	NO
		KEY OPERATED	59066-19*	5	NO	YES	NO
	3-POSITION SPRING RETURN FROM BOTH SIDES TO CENTER	STANDARD KNOB	59066-20	6	NO	NO	YES
		GLOVED HAND KNOB	59066-21	7	YES	YES	NO
		KEY OPERATED	59066-22	8	YES	NO	YES
				9	NO	YES	YES
				10	YES	YES	YES

*Key-operated selector switch type numbers must be completed by selecting appropriate key withdrawal number from above table. Positions marked "yes" are those in which key can be withdrawn, locking switch in that position. Insert the appropriate number in place of asterisk shown in type number.

SELECTOR SWITCH LEGEND PLATES

2 POSITION				3 POSITION			
MODEL NO.	PLATE MARKING	MODEL NO.	PLATE MARKING	MODEL NO.	PLATE MARKING	MODEL NO.	PLATE MARKING
59068-21	Start - Stop	59068-66	On - Off	59068-26	For. - Off - Rev.	59068-80	Jog - Stop - Run
59068-22	Off - On	59068-67	Raise - Lower	59068-27	Auto. - Off - Hand	59068-81	Slow - Off - Fast
59068-23	High - Low	59068-68	Run - Jog	59068-28	Open - Off - Close	59068-82	Summer - Off - Winter
59068-24	Open - Close	59068-69	Safe - Run	59068-29	Up - Off - Down		
59068-25	Slow - Fast	59068-70	Up - Down	59068-30	Blank	59068-83	High - Low - Off
59068-30	Blank	59068-71	Low - High	59068-75	Hand - Off - Auto.	59068-84	Raise - Off - Lower
59068-62	For. - Rev.	59068-72	Stop - Start	59068-76	Jog - Safe - Run		
59068-63	Hand - Auto.	59068-73	Left - Right	59068-77	Man - Off - Auto.		
59068-64	Jog - Run	59068-74	Summer - Winter	59068-78	Low - Off - High		
59068-65	Man. - Auto.			59068-79	For. - Safe - Rev.		

PUSH BUTTON OPERATORS



MODEL 59068 Operators are used in conjunction with No.'s 59064 and 59065 Basic Valve Kits to make up pneumatic push button controls. All operators can be panel mounted, simplifying the construction of pneumatic control stations and panels. Each operator will operate one or two control valves. Panel thickness 1/16" min., 1/4" max.

OPERATOR	
DASH NO.	DESCRIPTION
	1 3/8" MUSHROOM BUTTON. Red only.
	WITHOUT GUARD
	EXTENDED GUARD
	FULL GUARD
	STANDARD HALF GUARD

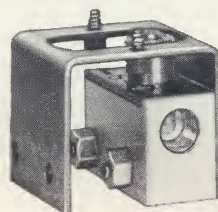
NOTE: 11-12-13-14 furnished with blue, black, red, green, brown, yellow, orange color inserts.

PUSH BUTTON LEGEND PLATES			
MODEL NO.	PLATE MARKING	MODEL NO.	PLATE MARKING
59068-10	HIGH	59068-41	LOWER
59068-11	LOW	59068-42	RESET
59068-12	IN	59068-43	RUN
59068-13	OUT	59068-44	START JOG
59068-14*	EMERGENCY STOP	59068-45	TEST
59068-15	START	59068-46	RAISE
59068-16*	STOP	59068-47	DECREASE
59068-17	OPEN	59068-48	INCREASE
59068-18	CLOSE	59068-49	LEFT
59068-19	ON	59068-50	RIGHT
59068-20*	OFF	59068-51	CYCLE START
59068-30	BLANK	59068-52	FEED START
59068-31	FORWARD	59068-53	CYCLE STOP
59068-32	REVERSE	59068-54	FEED STOP
59068-33	DOWN	59068-55	MOTOR RUN
59068-34	UP	59068-56	MOTOR STOP
59068-35	FAST	59068-57	POWER ON
59068-36	SLOW	59068-58	FULL SPEED
59068-37	INCH	59068-59	LOW SPEED
59068-38	JOG	59068-60	SECOND SPEED
59068-39	JOG FORWARD	59068-61	THIRD SPEED
59068-40	JOG REVERSE		

* RED FIELD

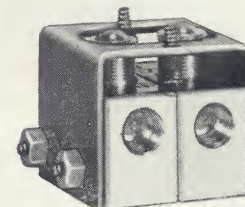
PUSH BUTTON & SELECTOR SWITCH BASIC VALVE KITS

KIT 59064 is made up of a valve, mounting bracket and necessary fasteners for mounting 2-position selector switches and push button operators. Each valve can be utilized to perform any of the following valve functions: 3-way NC, 3-way NO, 3-way multi-purpose, 2-way NC, 2-way NO, Bleeder NC and Bleeder NO.



KIT 59064

KIT 59065 is made up of 2 valves, mounting bracket and necessary fasteners for mounting two or three position selector switches and push button operators. Each valve can be utilized to perform any of the following valve functions: 3-way NC, 3-way NO, 3-way multipurpose, 2-way NC, 2-way NO, Bleeder NC and Bleeder NO.



KIT 59065

A push button operator or 2-position selector actuates both valves simultaneously. This arrangement is used for parallel control on 4-way valve functions. Mounting dimensions 2" x 3 3/4" centers.

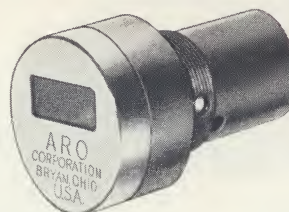
NOTE: 3 3/4" dimensions may be reduced dependant on type fittings used in connecting valves.

3 POSITION SELECTOR OPERATORS (2 valves required)

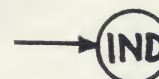
SELECTOR POSITION	LEFT	CENTER	RIGHT
Actuated Position Left Valve	X	X	
Actuated Position Right Valve		X	X

PNEUMATIC INDICATOR

MODEL 59073 The pneumatic indicator, like its electrical counterpart, is used for monitoring. When pressure is applied to the input, a red signal flag appears in the window. It can be connected to any control line in a circuit where on-off indication is desired. It fits the same mounting holes and requires the same spacing as the panel mounted controls. May be mounted on 1 3/4" minimum centers. Panel thickness 1/16" min., 1/4" max.



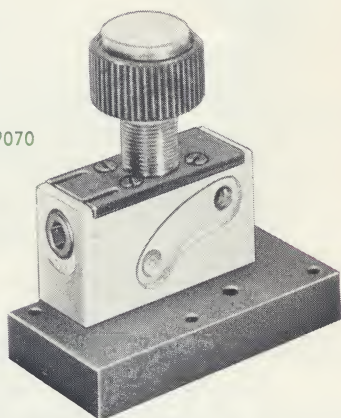
PNEUMATIC INDICATOR
MODEL 59073



CIRCUIT BOARD MOUNTING STYLE

Four types of actuators are available with mounting bases for attachment to the circuit board. All actuators can be connected to perform the following valve functions: 3-way NC, 3-way NO, 3-way multipurpose, 2-way NC, 2-way NO, Bleeder NC and Bleeder NO. Necessary seals and mounting screws furnished with each model actuator. Mounting base dimensions: 1 1/4" x 2 1/2". Requires 2 element circuit board spaces.

MODEL 59070

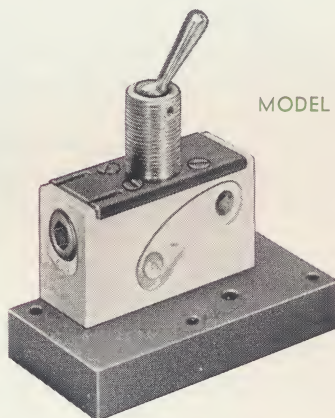


MODEL 59070

PUSH BUTTON for momentary actuation. Actuating force 34-59 oz. Actuating stroke .062". Overtravel .125".

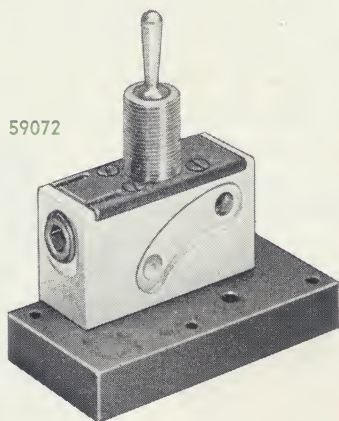
MODEL 59071

RETAINED TOGGLE for maintained actuation; two positions. Actuating force 17-29 oz. Actuating stroke 70°.



MODEL 59071

MODEL 59072



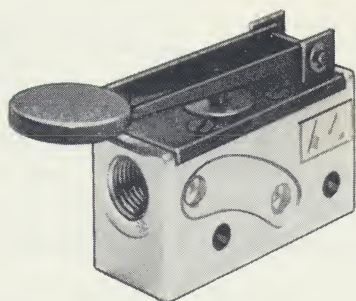
MODEL 59072

CENTERING TOGGLE for momentary actuation; toggle is self-centering. Actuating force 17-29 oz. Actuating stroke 30°.

MECHANICAL & MANUAL ACTUATORS

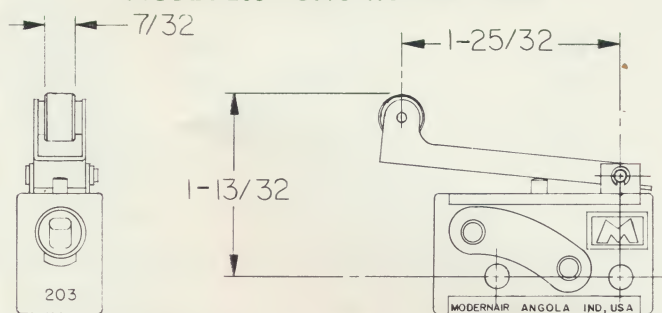
New miniature 3-way 1/8" N.P.T. control valves are available in fifteen actuator styles. Five are manual, ten are mechanical ... eight may be panel mounted. All valves may be connected to perform any of the following functions — 3-way NC, 3-way NO, 3-way multipurpose, 2-way NC, 2-way NO, Bleeder NC and Bleeder NO. Flow capacity 6 C.F.M. at 100 P.S.I.G.

FINGER TIP LEVER



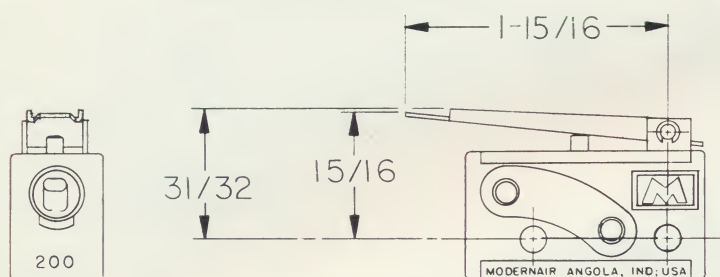
MODEL 201

MODEL 203 LONG ROLLER LEVER



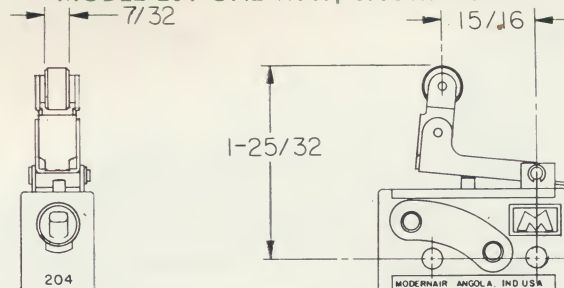
Actuating Force 13-23 oz. Actuating Stroke .160". Overtravel .040".

MODEL 200 PLAIN LEVER



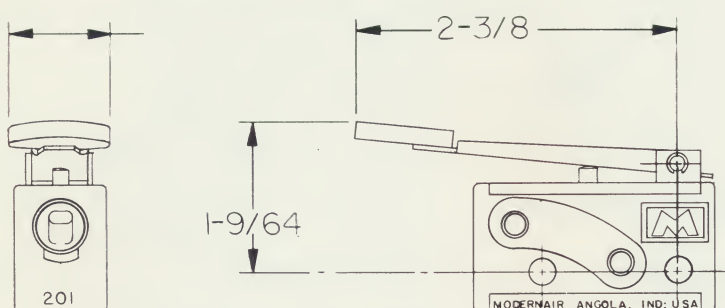
Actuating Force 11-20 oz. Actuating Stroke .195". Overtravel .055".

MODEL 204 ONE-WAY, SHORT LEVER



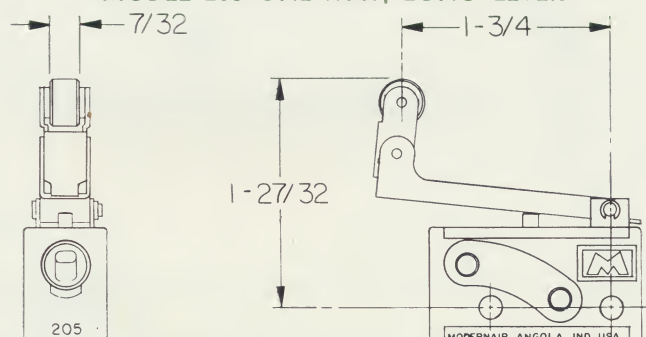
Actuating Force 19-33 oz. Actuating Stroke .089". Overtravel .027".

MODEL 201 FINGERTIP LEVER



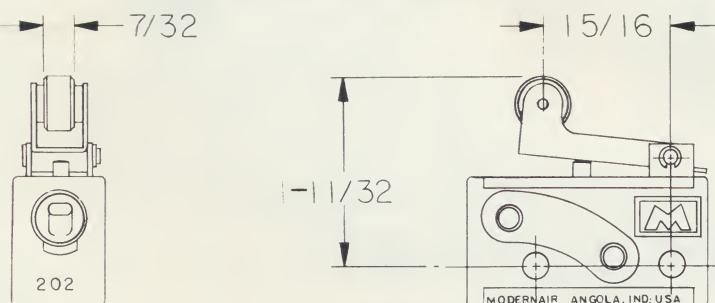
Actuating Force 10-17 oz. Actuating Stroke .289". Overtravel .086".

MODEL 205 ONE-WAY, LONG LEVER



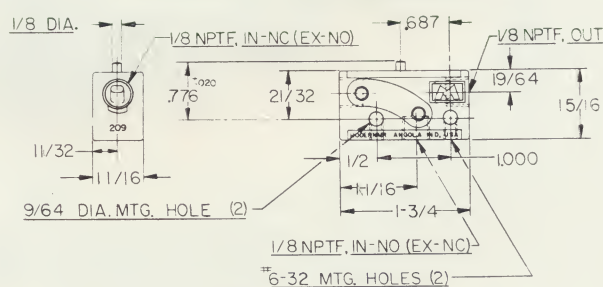
Actuating Force 11-20 oz. Actuating Stroke .164". Overtravel .043".

MODEL 202 SHORT ROLLER LEVER

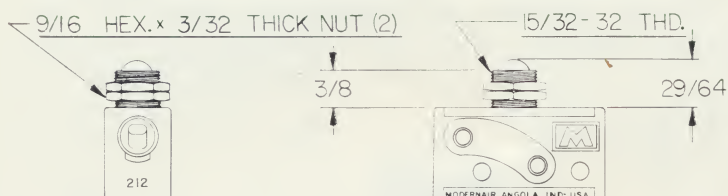


Actuating Force 23-41 oz. Actuating Stroke .086". Overtravel .024".

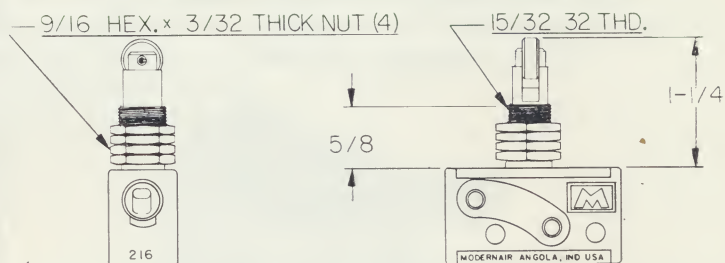
* MODEL 209 PIN PLUNGER



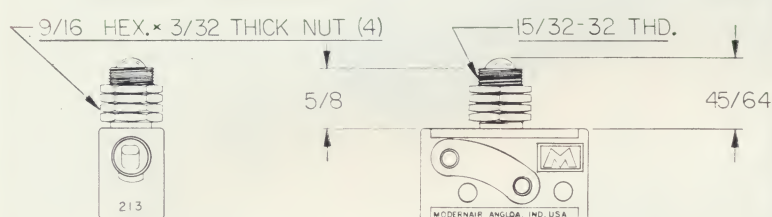
Actuating Force 34-59 oz. Actuating Stroke .062". Overtravel .015".

MECHANICAL & MANUAL ACTUATORS
*** MODEL 212 BALL ROLLER, SHORT**


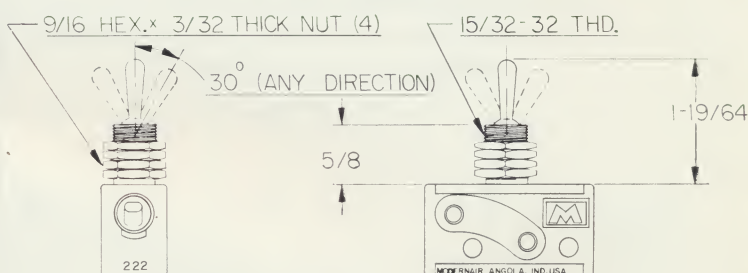
Actuating Force 34-59 oz. Actuating Stroke .062". Overtravel .015".

*** MODEL 216 CROSS-ROLLER PLUNGER**


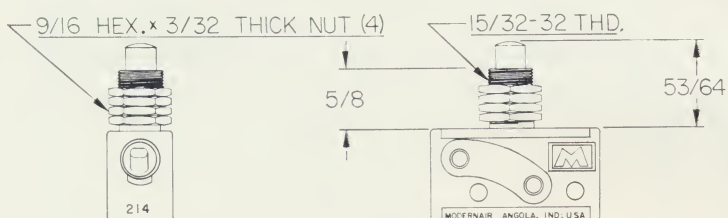
Actuating Force 34-59 oz. Actuating Stroke .062". Overtravel .131".

*** MODEL 213 BALL ROLLER, LONG**


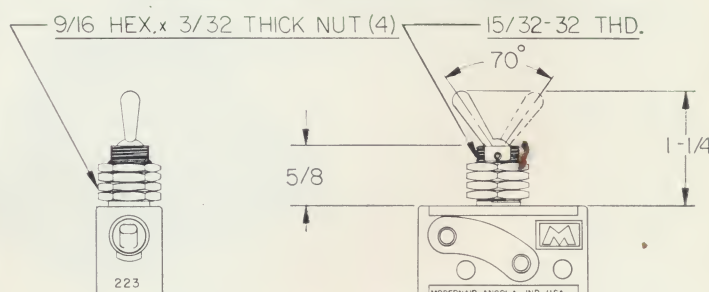
Actuating Force 34-59 oz. Actuating Stroke .062". Overtravel .015".

MODEL 222 CENTERING TOGGLE


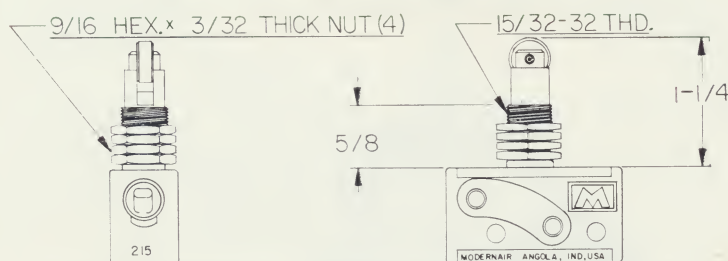
Actuating Force 17-29 oz. Actuating Stroke 30°.

*** MODEL 214 STRAIGHT PLUNGER**


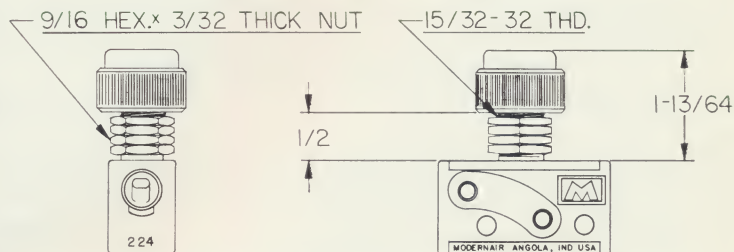
Actuating Force 34-59 oz. Actuating Stroke .062". Overtravel .131".

MODEL 223 RETAINED TOGGLE


Actuating Force 17-29 oz. Actuating Stroke 70°.

*** MODEL 215 ROLLER PLUNGER**


Actuating Force 34-59 oz. Actuating Stroke .062". Overtravel .131".

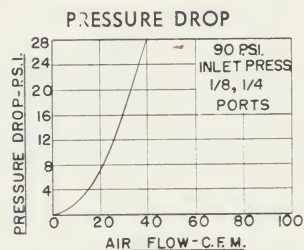
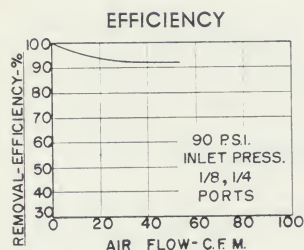
MODEL 224 PANEL BUTTON


Actuating Force 34-59 oz. Actuating Stroke .062". Overtravel .125".

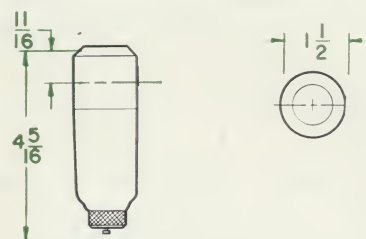
* VALVE PIPED	PRETRAVEL	FULLY ACTUATED
Normally Closed	.025	.062
Normally Open	.000	.032

FILTERS 1/8" & 1/4"

MODEL 25110 Furnished with Safe-Gard® plastic bowl, 40-micron element and choice of port sizes. For optional equipment, specify model number and dash number or letter as listed to the right under CODE. All flow specifications are based upon inlet pressure of 90 psi.



25110



OPTION	CODE
20-MICRON ELEMENT	-3

Model No.	Port Size	Micron Size	Filter Area	Sump Cap.	Net Weight	A	B
25110	1/8"	40	2.3 sq. in.	1/2 oz.	.42 lbs.	11 CFM	19 CFM
25120	1/4"	40	2.3 sq. in.	1/2 oz.	.42 lbs.	19 CFM	19 CFM

REGULATORS 1/8" & 1/4"

MODEL 27110 Furnished with range of 5 to 125 psi 1/8" regulated gauge ports, choice of inlet and outlet port sizes. For optional equipment, specify basic model number and dash number or letter listed below under CODE. If gauge is ordered, No. 29850 will be furnished unless different pressure range is specified.

OPTION	CODE
0-50 LBS. PRESSURE RANGE	-1
10-125 LBS. PRESSURE RANGE	-2
PRESSURE GAUGE	-G
PANEL-MOUNT MODEL	-P
MOUNTING BRACKET	29201

NOTE ON GAUGES: Optional gauges and optional pressure ranges are paired as shown below.

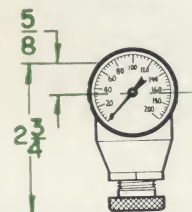
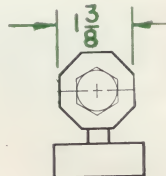
PRESSURE RANGE	GAUGE USED
0-50 PSI	29863, 1/8" male
10-250 PSI	29849, 1/8" male



27110-P
PANEL - MOUNT
REGULATOR



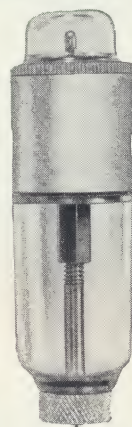
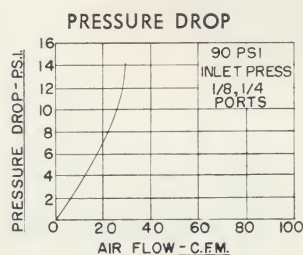
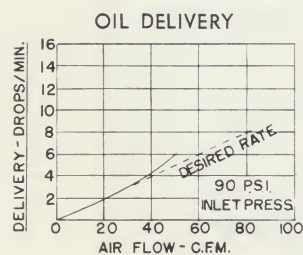
27110



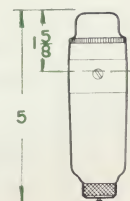
Port Size	Both Ports Regulated	One Port Regulated A	One Port Regulated B	Pressure Range P.S.I.	Gauge Ports	Net Weight
1/8"	27110	27111	27112	5-125	1/8"	.28 lbs.
1/4"	27120	27121	27122	5-125	1/8"	.28 lbs.

FOG-TYPE LUBRICATORS 1/8" & 1/4"

MODEL 26110 Furnished with Safe-Gard® plastic bowl, external feed-rate adjustment knob at rear, and choice of port sizes. Since the bowl has maximum wall thickness in relation to the circumference, the resulting strength is unusually high. All flow specifications are based upon inlet pressure of 90 psi.



MODEL 26110



Port Size	Model No.	Oil Capacity	Net Weight	Recommended Air Flow Min.	Recommended Air Flow Max.	A
1/8"	26110	1/2 oz.	.38 lbs.	1 CFM	20 CFM	11 CFM
1/4"	26120	1/2 oz.	.38 lbs.	1 CFM	20 CFM	19 CFM

SUMMARY OF LOGIC FUNCTIONS AND VALVE FUNCTIONS RELATED TO
ARO PNEUMATIC LOGIC CONTROL SYSTEM.

LOGIC FUNCTION	SYMBOL	ARO LOGIC ELEMENT TYPE	VALVE TYPE & FUNCTION
OR		OR	3-way MP
AND		AND	3-way NC
NOT		NOT	3-way NO
NOR		NOT, OR	3-way NO
NAND		NOT, AND	3-way MP
IMPLICATION		OR, NOT	3-way MP
NON IMPLICATION		NOT	3-way NO
EXCLUSIVE OR	$(A \cdot \bar{B}) + (\bar{A} \cdot B)$	AND, OR, NOT	
EQUIVALENCE	$(A \cdot B) + (\bar{A} \cdot \bar{B})$	AND, OR, NOT	
MEMORY		MEM	3-way NC, retained
FLIP - FLOP		NOT, OR	4-way, retained
DIFFERENTIATOR		DIF	Pulse
DELAY		TIM, AND, NOT	Delay

TECHNICAL DATA & RECOMMENDATIONS

OPERATING PRESSURE.

Optimum range 50 to 125 P.S.I.G.

Maximum range 25 to 150 P.S.I.G.

No limit on minimum operating pressure for mechanically actuated valves.

PRESSURE REGULATION.

Pressure regulation is recommended for applications where optimum repeatability is required, such as circuits with timing elements.

FLOW CAPACITY.

The logic elements have a minimum capacity factor of $C_v = 0.11$, which represents an equivalent sharp edge orifice dia. $= 0.078$.

Flow capacities of connecting holes in circuit board and 0.125" wide circuit channels are higher than the above values.

TUBING AND FITTINGS.

Control lines require tubing with an ID of 0.109 - 0.125" and passages in fittings should not be less than 0.125" dia., if optimum performance is desired.

TEMPERATURE.

Optimum range 32° to 160° F.

Maximum range -40° to 225° F.

LUBRICATION.

All components are suited for non-lubricated service. Lubrication can be applied but only to circuits without timing elements.

FILTERING.

Filtering is recommended to assure clean, dry air supply. It is mandatory for circuits with timing elements.



PNEUMATIC LOGIC CONTROLS

THE ARO CORPORATION
400 ENTERPRISE STREET
BRYAN, OHIO 43506

